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IS 3452-2 (1970): Toggle Switches, Part 2: Toggle Switches, Type I and type II [LITD 3: Electromechanical Components and Mechanical Structures for Electronic Equipment]



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IS : 3452 (Part II) - 1970
(Reaffirmed 1998)

Indian Standard

**SPECIFICATION FOR
TOGGLE SWITCHES**

PART II TOGGLE SWITCHES, TYPE I AND TYPE II

(Third Reprint JUNE 2000)

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

AMENDMENT NO. 2 JANUARY 1983

TO

IS:3452(Part II)-1970 SPECIFICATION FOR
TOGGLE SWITCHES

PART II TOGGLE SWITCHES, TYPE I AND TYPE II

Alterations

(Page 9, Table 3, col 3, third entry) - Substitute the following for the existing entry at this place and all other places, wherever this test appears:

'Method of test: Current of 1A from a source of emf with a voltage 2-6 V, unless otherwise specified'

(Page 12, Table 3, col 3, fourth lot, first entry) - Substitute the following for the existing matter:

'10 000 operations at standard temperature for Category 3. At rated voltage and rated current.'

(Page 13, Appendix A) - Delete.

(LTDC 7)

AMENDMENT NO. 3 AUGUST 1990
TO
IS 3452 (Part 2) : 1970 SPECIFICATION FOR
TOGGLE SWITCHES

PART 2 TOGGLE SWITCHES,
TYPE 1 AND TYPE 2

(Page 3, clause 0.6, line 1) - Substitute
'IS :9000†' for 'IS 589 : 1961†'.

(Page 3, foot-note marked with '†' mark)-
Substitute the following for the existing
foot-note:

' † Basic environmental testing procedures
for electronic and electrical items.'

(LTD 7)

AMENDMENT NO. 1 AUGUST 1981

TO

IS:3452(Part II)-1970 SPECIFICATION FOR TOGGLE SWITCHES
PART II TOGGLE SWITCHES, TYPE I AND TYPE II

Alteration

(Pages 9 to 12, Table 3, col 3, against 'Voltage proof') - Substitute '1 kV (rms)' for '2 kV (rms)', wherever it appears in the table.

(LTDC 7)

Indian Standard

SPECIFICATION FOR TOGGLE SWITCHES

PART II TOGGLE SWITCHES, TYPE I AND TYPE II

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IS : 3452 (Part II) - 1970

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Indian Standard

SPECIFICATION FOR TOGGLE SWITCHES

PART II TOGGLE SWITCHES, TYPE I AND TYPE II

0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 15 April 1970, after the draft finalized by the Electromechanical Components for Electronic Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard covers the requirements for toggle switches, Type I and Type II and should be read in conjunction with IS : 3452 (Part I)-1966* which is a necessary adjunct to this standard.

0.3 A series of Indian Standards on toggle switches is being prepared with the object of specifying:

- a) uniform electrical properties,
- b) uniform mechanical properties,
- c) safety aspects,
- d) methods of test, and
- e) dimensional requirements to ensure interchangeability and compatibility.

0.4 In preparing this standard, assistance has been derived from IEC Pub 131-2 'Lever Switches, Part 2: Requirements for Switches of Type I, Slow-make Slow-break' issued by the International Electrotechnical Commission.

0.5 In Appendix A, information for use of these switches has been given. Appendix B gives the dimensions for mounting purposes.

0.6 This standard requires reference to IS : 589-1961† so far as the details of the climatic and mechanical testing procedures are concerned; only the relevant degrees of severity and performance requirements have been specified in this standard.

0.7 This standard is one of a series of Indian Standards on electromechanical components for electronic equipment.

*Specification for toggle switches: Part I General requirements and tests.

†Basic climatic and mechanical durability tests for electronic components (revised).

IS : 3452 (Part II) - 1970

0.8 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part II) covers the requirements for toggle switches of Type I and Type II used in electronic and telecommunication equipment.

1.2 The toggle switches used in electrical appliances and electrical wiring installations in buildings and other similar locations as well as sealed type of toggle switches are not covered by this standard.

2. TERMINOLOGY

2.0 For the purpose of this standard, the definitions of terms given in 2 of IS : 3452 (Part I)-1966† shall apply in addition to the definitions given below.

2.1 Type I—Type I toggle switches shall have general configuration as given in Fig. 1 to 4 with terminals arranged on the side of the switches. The shape shown in the figures is typical.

2.2 Type II—Type II toggle switches shall have general configuration as given in Fig. 5 with terminals arranged at the rear so that stacking of the switches is possible. The shape shown in the figure is typical.

3. CLIMATIC SEVERITIES

3.1 The toggle switches covered by this standard shall conform to Category 3 as specified in IS : 3452 (Part I)-1966†.

4. MATERIALS AND WORKMANSHIP

4.1 The provisions of 4 of IS : 3452 (Part I)-1966† shall apply.

4.1.1 Terminations—The terminations for Type I and Type II switches shall be as indicated in 2.1 and 2.2 respectively.

5. DIMENSIONS

5.1 Type I Switches—The dimensions of toggle switches, Type I, covered by this standard, shall be in accordance with Fig. 1 to 4 and Table 1.

*Rules for rounding off numerical values (revised).

†Specification for toggle switches: Part I General requirements and tests.

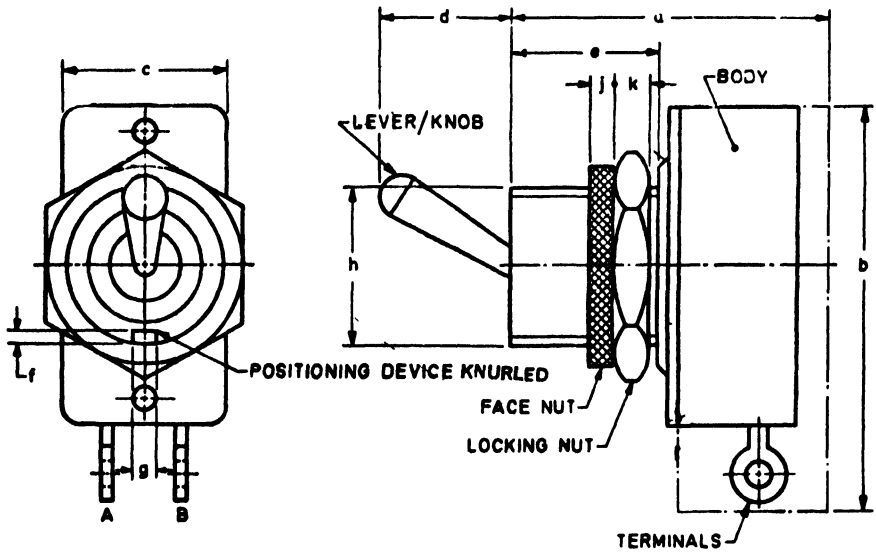


FIG. 1 SPST SWITCH

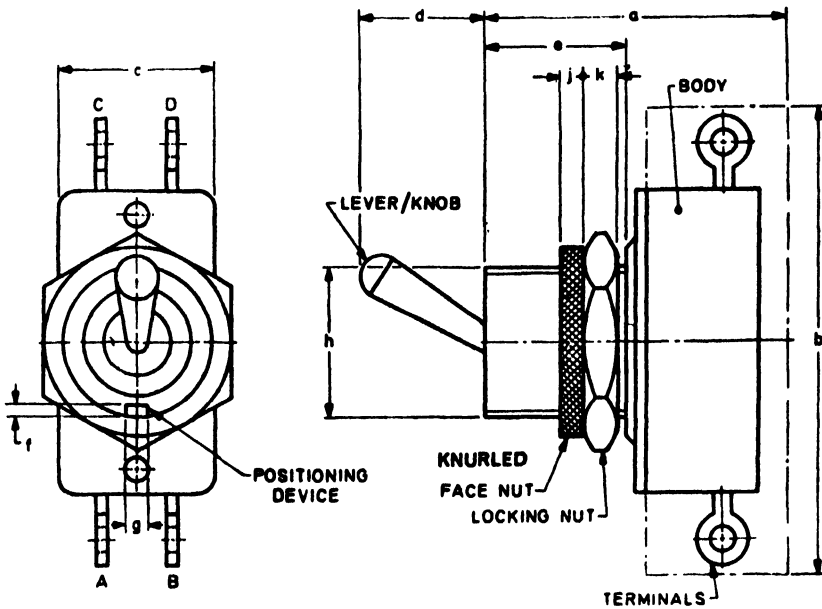


FIG. 2 SPDT SWITCH

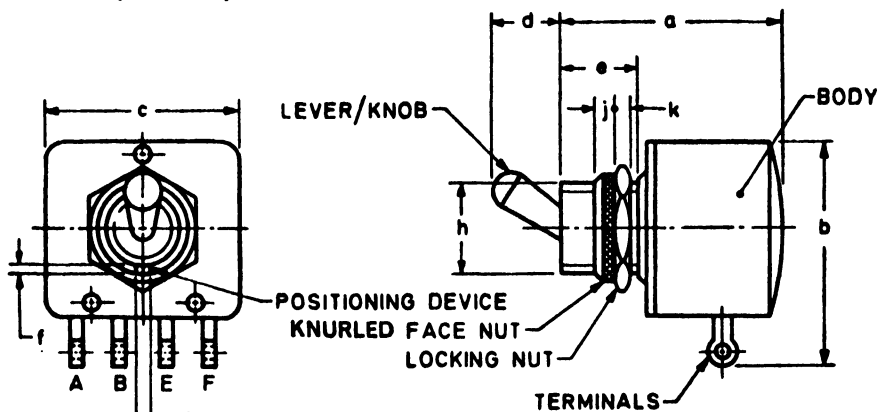


FIG. 3 DPST Switch

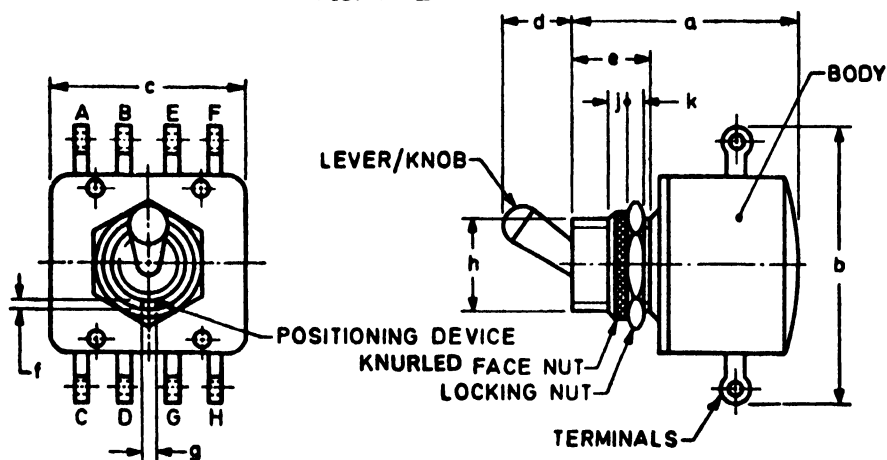


FIG. 4 DPDT Switch

TABLE 1 DIMENSIONS OF TOGGLE SWITCHES, TYPE I

(Clause 5.1)

All dimensions in millimetres.

TYPE OF OPERATION	FIG.	DIMENSION, Max									
		a	b	c	d	e	f	g	h	α	j k
SPST	1	25	30.5	12.5	$\left. \begin{array}{l} 10 \\ \text{to } 12 \pm 1 \\ 15 \end{array} \right\}$	$\left. \begin{array}{l} 1 \pm 0.2 \\ 1.5 \pm 0.2 \end{array} \right\}$	$\left. \begin{array}{l} 1.5 \pm 0.2 \\ 2 \end{array} \right\}$	$\left. \begin{array}{l} 12 \\ \text{pitch } 25 \\ 1 \text{ mm} \end{array} \right\}$	$\left. \begin{array}{l} 25 \\ 50^\circ \end{array} \right\}$	$\left. \begin{array}{l} 2.1 \\ 2.77 \end{array} \right\}$	$\left. \begin{array}{l} 2 \\ \text{to } 2.4 \end{array} \right\}$
SPDT	2	25	37	12.5							
DPST	3	30	30.5	26.5							
DPDT	4	30	37	26.5							

5.2 Type II Switches — The dimensions of toggle switches, Type II, covered by this standard, shall be in accordance with Fig. 5 and Table 2 for all combinations of operation, namely, SPST, SPDT, DPST and DPDT.

TABLE 2 DIMENSIONS OF TOGGLE SWITCHES, TYPE II

All dimensions in millimetres.

RATING OF SWITCH A	DIMENSION, Max										
	a	b	c	d	e	f	g	h	α	j	k
3	38	31	18	$\left. \begin{array}{l} 10 \\ \text{to} \\ 15 \end{array} \right\}$	12 ± 1	1 ± 0.2	1.5 ± 0.2	$\left. \begin{array}{l} 12 \\ \text{pitch} \\ 1 \text{ mm} \end{array} \right\}$	$\left. \begin{array}{l} 25 \\ \text{to} \\ 50^\circ \end{array} \right\}$	$\left. \begin{array}{l} 2.1 \\ \text{to} \\ 2.77 \end{array} \right\}$	$\left. \begin{array}{l} 2 \\ \text{to} \\ 2.4 \end{array} \right\}$
4	40	31	18								
5	40	33	18								

6. ELECTRICAL RATINGS

6.1 The preferred ratings for toggle switches are given below [see 5 of IS : 3452 (Part I)-1966*]:

- a) Rated voltage — 250 V ac (rms) 50 Hz
- b) Rated current — For Type I — 2 A ac (rms), 50 Hz
For Type II — 3, 4 and 5 A ac (rms), 50 Hz

7. MARKING

7.1 The following details shall be marked on each switch in the order given below:

- a) Voltage and current ratings and type of current, that is, dc or ac (rms);
- b) Manufacturer's type number;
- c) Manufacturer's name and/or trade-mark;
- d) Indication of terminations shall comply with Fig. 1 to 4 for Type I switches and Fig. 5 for Type II switches; and
- e) Any additional marking agreed to between the purchaser and the manufacturer.

7.2 Provisions of 6.1.1 and 6.2 of IS : 3452 (Part I)-1966* shall also apply.

*Specification for toggle switches : Part I General requirements and tests.

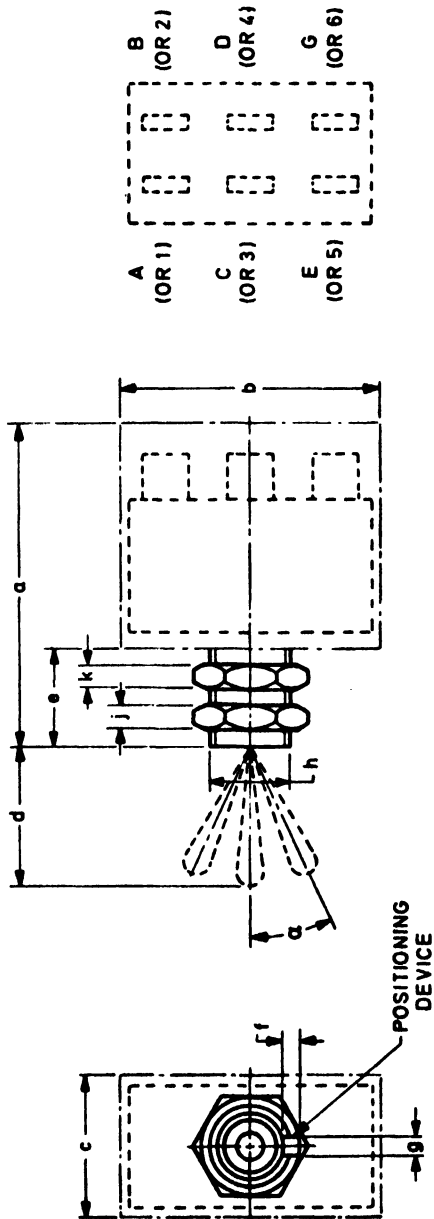


FIG. 5 OVERALL DIMENSIONS OF DOUBLE-POLE TOGGLE SWITCHES

8. TEST SCHEDULE

8.1 General — This test schedule specifies all tests and the order in which they shall be carried out as well as the requirements to be met with.

8.2 Classification of Tests — The provisions of 7 of IS : 3452 (Part I)-1966* shall apply.

8.3 Conditions of Tests — The provisions of 8 of IS : 3452 (Part I)-1966* shall apply.

8.4 Test Schedule — The test schedule shall be as specified in Table 3.

NOTE 1 — The clause references, conditions of test and requirements specified are applicable for acceptance tests also and the grouping into lots is for the purpose of type tests only (see 8.2).

NOTE 2 — Conditions of tests and values for the requirements that are to be specified according to IS : 3452 (Part I)-1966* only are given in col 3 and 4 of Table 3. Other conditions and requirements of test are according to IS : 3452 (Part I)-1966*.

TABLE 3 TEST SCHEDULE

[see also Appendix A of IS : 3452 (Part I)-1966*]

TEST	CLAU SE REFERENCE OF IS : 3452 (Part I)- 1966*	CONDIT IONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)
<i>All Samples</i>			Category 3
General examination	9 for marking (see also 7.1 of this standard)	—	—
Dimension	10	—	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	20 m Ω , <i>Max</i>
Insulation resistance	11.2	Test voltage : 500 \pm 50 V dc	100 M Ω , <i>Min</i>
Voltage proof	11.3	Test voltage : 2 kV (rms)	—
Radio frequency shunt resistance	11.5	Under consideration	Under consideration

Samples shall then be divided into five lots and the switches
in each lot shall undergo the tests specified for each lot.

*Specification for toggle switches: Part I General requirements and tests.

(Continued)

*Specification for toggle switches: Part I General requirements and tests.

TABLE 3 TEST SCHEDULE — *Contd*

TEST	CLAUSE REFERENCE OF IS : 3452 (Part I)- 1966*	CONDITIONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)
<i>First Lot</i>			Category 3
Impact test on actuating lever	12.2	—	—
Steady load on actuating lever	12.3	—	—
Switching mechanism	12.5	Angle : 25 to 50°	—
Operating force	12.1	—	Locking : 5 to 25 N Non-locking : 10 to 30 N
Soldering	12.6	For tag terminations only Method 2 : Bit size— 8 mm dia	—
Robustness of terminations	12.4	Loading weight : 4 kg	—
Voltage proof	11.3	Test voltage : 2kV (rms)	—
Vibration	12.7	10-500-10 Hz	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	Under consideration
Bump	—	—	—
<i>Climatic Sequence</i>	13.2	—	—
Dry heat	13.2.1	Maximum category temperature	—
Insulation resistance at high temperature	13.2.1.3	Test voltage : 500 ± 50 V dc	10 MΩ, Min
Damp heat (accelerated) first cycle	13.2.2	One cycle	—
Cold	13.2.3	Minimum category temperature	—
Low air pressure	13.2.4.	Category 3 — 600 mbar Test voltage : 375 V (rms)	—

*Specification for toggle switches: Part I General requirements and tests.

(Continued)

TABLE 3 TEST SCHEDULE — *Contd*

TEST	CLAUSE REFERENCE OF IS : 3452 (Part I) - 1966*	CONDITIONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)
			Category 3
Damp heat (accelerated) Remaining cycles	13.2.5	—	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	40 m Ω , <i>Max</i>
Insulation resistance	11.2	Test voltage 500 \pm 50 V dc	10 M Ω , <i>Min</i>
Voltage proof	11.3	Test voltage 2 kV (rms)	—
General examination	9 for marking (see also 7.1 of this standard)	—	—
<i>Second Lot</i>			
Impact test on actuating lever	12.2	—	—
Steady load on actuating lever	12.3	—	—
Overload	11.7	a) Minimum voltage : Test voltage 30 V dc at 10 A b) Maximum voltage : Test voltage : 250 V ac at 4 A	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	40 m Ω , <i>Max</i>
Insulation resistance	11.2	Test voltage : 500 \pm 50 V dc	100 M Ω , <i>Min</i>
Salt mist	13.6	—	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	40 m Ω , <i>Max</i>

*Specification for toggle switches: Part I General requirements and tests.

(Continued)

IS : 3452 (Part II) - 1970
TABLE 3 TEST SCHEDULE — Contd

TEST	CLAUSe REFERENCE OF IS : 3452 (Part I) - 1966*	CONDITIONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)
			Category 3
Insulation resistance	11.2	Test voltage : 500 \pm 50 V dc	10 M Ω , <i>Min</i>
Voltage proof	11.3	Test voltage : 2 kV (rms)	—
General examination	9	—	—
<i>Third Lot</i>			
Damp heat (long term exposure)	13.3	Period of recovery : Cate- gory 3 — 24 h	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	40 m Ω , <i>Max</i>
Insulation resistance	11.2	Test voltage : 500 \pm 50 V dc	10 M Ω , <i>Min</i>
Voltage proof	11.3	Test voltage : 2 kV (rms)	—
General examination	9 for marking (see also 7.1 of this standard)	—	—
<i>Fourth Lot</i>			
Endurance	14.2	10 000 operations at standard temperature for Category 3. Test voltage and current according to table in Appendix A	—
Impact test on actuating lever	12.2	—	—
Steady load on actuating lever	12.3	—	—
Contact resistance	11.1	Method of test : Current of 1 A from a source of emf not exceeding 20 mV (dc or ac peak)	40 m Ω , <i>Max</i>
Insulation resistance	11.2	Test voltage : 500 \pm 50 V dc	10 M Ω , <i>Min</i>
Voltage proof	11.3	Test voltage : 2 kV (rms)	—
General examination	9 for marking (see also 7.1 of this standard)	—	—
<i>Fifth Lot</i>			
Mould growth	13.7	—	—

*Specification for toggle switches: Part I General requirements and tests.

APPENDIX A

(Clause 0.5)

SERVICE ENGINEERING DATA

NUMBER OF POSITIONS		CURRENT PER CONTACT (A)										
		Direct Current					Alternating Current 40-60 Hz					
		Resistance circuit 30 V	Lamp load 25/30 V	Induc- tive circuit 30 V	Resis- tive circuit 125 V	Resis- tive circuit 250 V	Resistive circuit 115 V	Inductive circuit 115 V	Resistive circuit 250 V	Lamp load 115 V	Resistive circuit 115 V	Inductive circuit 115 V
Single Pole	2	20	5	15	0.75	0.5	15	7.5	5	3	10	10
	2											
	2	15	5	10	0.75	0.5	15	7.5	5	2	10	7
	2											
	3											
	3											
Double Pole	2	20	7	15	0.75	0.5	25	—	8	4	20	15
	2											
	2	18	5	10	0.75	0.5	15	—	5	2	11	8
	2											
	3											
	3											

APPENDIX B

(*Clause 0.5*)

DIMENSIONS FOR MOUNTING PURPOSES

B-1. The dimensions for mounting purposes shall be as follows:

Maximum thickness of mounting plate	4 mm
--	------

Diameter of mounting hole 13 mm

NOTE — The dimensions of the mounting hole have been chosen so that M12 screw threads may be used.

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